

## **REMARKS**

Upon entry of this amendment, claims 1-3, 5, 8-28, 30-32, 34 and 37-40 are all the claims pending in the application. Claims 4, 6, 7, 29, 33, 35, 36 and 41-123 have been canceled by this amendment. Applicant notes that claims 1-3, 5 and 14 are drawn to the elected invention, and that the remaining pending claims have been withdrawn from consideration.

### **I. Objections to the Specification**

The Examiner has objected to the specification for the reasons set forth on page 2 of the Office Action. Applicant has amended page 88 of specification in a manner to address the Examiner's objection. Accordingly, Applicant respectfully requests that the Examiner reconsider and withdraw the objection to the specification.

### **II. Claim Rejections**

A. Claims 1-4 and 14 were rejected under 35 U.S.C. § 102(b) as being anticipated by Ulrich (U.S. 4,087,159); and claims 6 and 7 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Ulrich (U.S. 4,087,159) in view of Lock et al. (U.S. 2003/0215203).

Applicant notes that claims 4, 6 and 7 have been canceled by this amendment, and the subject matter recited therein has been incorporated into claim 1.

Accordingly, claim 1 now recites that the optical transmission line has a refractive index distribution such that a central position in the direction of the thickness of the optical

transmission line has the highest refractive index and the refractive index does not increase with distance from the central position, wherein the optical transmission line is made of polysilane, and the refractive index distribution is provided by an oxygen concentration distribution when the polysilane is cured. Applicant respectfully submits that Ulrich and Lock do not teach or suggest the above-noted combination of features.

In the Office Action, Applicant notes that the Examiner has recognized that Ulrich does not disclose the above-noted features drawn to the optical transmission line being made of polysilane, and the refractive index distribution (i.e., a central position in the direction of the thickness of the optical transmission line having the highest refractive index and the refractive index does not increase with distance from the central position) being provided by an oxygen distribution when the polysilane is cured. The Examiner, however, has applied the Lock reference and has taken the position that Lock cures these deficiencies of Ulrich. Applicant respectfully disagrees.

Regarding Lock, Applicant notes that this reference discloses a waveguide that is formed by exposing a UV light source to a polysilane material (see the Abstract). In particular, as disclosed in Lock with reference to Figs. 4A-4D, the first step of forming the polysilane patternable waveguide involves the deposition of a low index cladding material 8 on a substrate 6 (see Fig. 4A and paragraph [0016]). Next, as shown in Fig. 4B of Lock, a polysilane material layer 10 is deposited on the cladding 8 (see paragraph [0017]).

After the polysilane material layer 10 is deposited, the waveguide 13 is patterned by using a mask 12 and the ultraviolet light source 14, wherein the exposed areas of the

polysilane material layer 10 (i.e., the areas not covered by the mask 12) are exposed to the ultraviolet light (see Fig. 4C and paragraph [0017]). In this regard, as explained in Lock, the areas of the polysilane material layer 10 that are exposed to the ultraviolet light undergo photooxidation and the refractive index of these areas decreases, resulting in a pattern that defines the cladding 8 along the sides of the waveguide 13 (see Fig. 4C and paragraph [0017]).

Thus, in Lock, by exposing selected areas of the polysilane material layer 10 (i.e., the areas of the polysilane material layer 10 not covered by the mask 12) to the ultraviolet light, it is possible to form the waveguide 13.

Regarding this formation of the waveguide 13, because the ultraviolet light is not exposed on the portion of the polysilane material layer 10 that forms the waveguide 13 (i.e., the portion of the polysilane material layer 10 covered by the mask 12), Applicant notes that the optical transmission line of Lock (i.e., the waveguide 13) has a uniform refractive index.

Accordingly, as the optical transmission line of Lock has a uniform refractive index, Applicant respectfully submits that Lock does not disclose or suggest the above-noted features recited in claim 1 drawn to the optical transmission line being made of polysilane, and the refractive index distribution (i.e., a central position in the direction of the thickness of the optical transmission line having the highest refractive index and the refractive index does not increase with distance from the central position) being provided by an oxygen distribution when the polysilane is cured.

In other words, in Lock, due to the absence of ultraviolet light reaching the polysilane

material layer resulting from the presence of the mask 12, the optical transmission line 13 of Lock is clearly not provided with the above-noted refractive index distribution as recited in claim 1, but instead, has a uniform refractive index.

In view of the foregoing, Applicant respectfully submits that the combination of Ulrich and Lock does not teach, suggest or otherwise render obvious all of the features recited in amended claim 1. Accordingly, Applicant submits that claim 1 is patentable over the cited prior art, an indication of which is kindly requested.

Claims 2, 3 and 14 depend from claim 1 and are therefore considered patentable at least by virtue of their dependency.

In addition, regarding non-elected claims 8-28, Applicant notes that these claims depend from claim 1 and are therefore considered allowable at least by virtue of their dependency. Further, regarding non-elected claim 30, Applicant notes that this claim has been amended so as to include all of the features recited in claim 1. Accordingly, upon the allowance of claim 1, Applicant respectfully submits that claim 30 should be rejoined and indicated as allowable. In this regard, Applicant notes that non-elected claims 31, 32, 34 and 37-40 depend from claim 30 and therefore should also be indicated as allowable upon the allowance of claim 30.

B. Claims 1-4 and 14 were rejected under 35 U.S.C. § 102(b) as being anticipated by B. Li et al. (IEEE Photonics Technology Letters, May 1999); and claims 6 and 7 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the Li et al. article (IEEE Photonics

Technology Letters, May 1999) in view of Lock et al. (U.S. 2003/0215203).

As noted above, claims 4, 6 and 7 have been canceled by this amendment, and the subject matter recited therein has been incorporated into claim 1.

Accordingly, claim 1 now recites that the optical transmission line has a refractive index distribution such that a central position in the direction of the thickness of the optical transmission line has the highest refractive index and the refractive index does not increase with distance from the central position, wherein the optical transmission line is made of polysilane, and the refractive index distribution is provided by an oxygen concentration distribution when the polysilane is cured. Applicant respectfully submits that Li and Lock do not teach or suggest the above-noted combination of features.

Regarding Li, Applicant notes that the Examiner has taken the position in the Office Action that this reference discloses the feature of an optical transmission line which has a refractive index distribution such that a central position in the direction of the thickness of the optical transmission line has the highest refractive index and the refractive index does not increase with distance from the central position. Applicant respectfully disagrees.

In particular, Applicant notes that while the Li reference discloses an application of multimode interference in a demultiplexer, that Li does not disclose or in any way suggest the above-noted feature drawn to an optical transmission line which has a refractive index distribution such that a central position in the direction of the thickness of the optical transmission line has the highest refractive index and the refractive index does not increase with distance from the central position.

If the Examiner disagrees and maintains the position that Li discloses such a feature, Applicant kindly requests that the Examiner explicitly identify the passages in Li that are being relied upon as allegedly disclosing this feature.

Further, Applicant notes that the Examiner has recognized that Li does not disclose the above-noted features drawn to the optical transmission line being made of polysilane, and the refractive index distribution (i.e., a central position in the direction of the thickness of the optical transmission line having the highest refractive index and the refractive index does not increase with distance from the central position) being provided by an oxygen distribution when the polysilane is cured. The Examiner, however, has again applied the Lock reference and has taken the position that Lock cures these deficiencies of Li. Applicant respectfully disagrees.

In particular, as discussed above with respect to Lock, Applicant notes that this reference discloses an optical transmission line 13 that is formed by placing a mask 12 over a portion of a polysilane material layer 10, wherein the exposed areas of the polysilane material layer 10 (i.e., the areas not covered by the mask 12) are exposed to ultraviolet light 14 (see Fig. 4C and paragraph [0017]). As discussed above, these exposed areas of the polysilane material layer 10 undergo photooxidation and the refractive index of such areas decreases resulting in a pattern that defines the cladding 8 along the sides of the waveguide 13 (see Fig. 4C and paragraph [0017]).

Thus, in Lock, because the ultraviolet light is not exposed on the portion of the polysilane material layer 10 that forms the waveguide 13, Applicant notes that the optical

transmission line of Lock (i.e., the waveguide 13) has a uniform refractive index.

Accordingly, as the optical transmission line of Lock has a uniform refractive index, Applicant respectfully submits that Lock does not disclose or suggest the above-noted features recited in claim 1 drawn to the optical transmission line being made of polysilane, and the refractive index distribution (i.e., a central position in the direction of the thickness of the optical transmission line having the highest refractive index and the refractive index does not increase with distance from the central position) being provided by an oxygen distribution when the polysilane is cured.

In other words, in Lock, due to the absence of ultraviolet light reaching the polysilane material layer resulting from the presence of the mask 12, the optical transmission line 13 of Lock is clearly not provided with the above-noted refractive index distribution as recited in claim 1, but instead, has a uniform refractive index.

In view of the foregoing, Applicant respectfully submits that the combination of Li and Lock does not teach, suggest or otherwise render obvious all of the features recited in amended claim 1. Accordingly, Applicant submits that claim 1 is patentable over the cited prior art, an indication of which is kindly requested.

Claims 2, 3 and 14 depend from claim 1 and are therefore considered patentable at least by virtue of their dependency.

C. Claim 5 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Ulrich (U.S. 4,087,159) in view of Nishizawa et al. (U.S. 3,614,197).

Claim 5 depends from claim 1. Applicant respectfully submits that Nishizawa does not cure the deficiencies of Ulrich and Lock, as noted above, with respect to claim 1. Accordingly, Applicant submits that claim 5 is patentable at least by virtue of its dependency.

D. Claim 5 was rejected under 35 U.S.C. § 103(a) as being unpatentable over the Li et al. article (IEEE Photonics Technology Letters, May 1999) in view of Nishizawa et al. (U.S. 3,614,197).

Claim 5 depends from claim 1. Applicant respectfully submits that Nishizawa does not cure the deficiencies of Li and Lock, as noted above, with respect to claim 1. Accordingly, Applicant submits that claim 5 is patentable at least by virtue of its dependency.

#### **IV. Conclusion**


In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited.



If any points remain in issue which the Examiner feels may best be resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Respectfully submitted,

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